

## CLAIMS:

1. Method of producing a semiconductor device comprising:
  - a) providing a semiconductor substrate,
  - b) providing an insulating layer on a top surface of the semiconductor substrate,
  - c) making an amorphous layer in a top layer of said semiconductor substrate by a  
5 suitable implant,
  - d) implanting a dopant into said semiconductor substrate through said insulating layer to provide said amorphous layer with a predetermined doping profile,
  - e) applying a solid phase epitaxial regrowth action to regrow said amorphous layer and activate said dopant, wherein  
10 in action d), said implant is performed such that said doping profile has a peak value located within said insulating layer.
2. Method according to claim 1, wherein said dopant is activated to provide said amorphous layer after action e) with a conductivity profile having a peak conductivity value  
15 located substantially at said top surface.
3. Method according to claim 1 or 2, wherein said semiconductor substrate is a Si substrate and action c) is performed with at least one of Ge, GeF<sub>2</sub>, Si, Xe or Ar atoms.
- 20 4. Method according to claim 3, wherein said action c) is performed with Ge in a dose of 10<sup>15</sup> atoms/cm<sup>2</sup> and an energy between 2 and 30 keV.
5. Method according to any of the preceding claims, wherein said action d) is performed with B at an energy of less than 5 keV.  
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6. Method according to claim 5, wherein said action d) is performed with B and a dose of 10<sup>15</sup> atoms/cm<sup>2</sup>.

7. Method according to claim 6, wherein action d) is performed at a temperature of 550-700 °C during about 1 minute.
8. Semiconductor device made by a solid phase epitaxial regrowth technique,  
5 comprising a top layer at a surface of a semiconductor substrate with a conductivity profile having a peak conductivity value located substantially at said surface.
9. Metal oxide semiconductor device comprising a device as claimed in claim 8.
- 10 10. Apparatus provided with a semiconductor device as claimed in claim 8 or 9.